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ABSTRACT

The relationship between recurrent otitis media (middle ear infection characterized by the presence of middle ear fluid and possibly leading to a temporary conductive hearing loss) and learning disabilities (LD) is examined. Traditional treatment approaches (antibiotic medication and surgery) are reviewed. The definition of LD is presented and the linkage between the two conditions is analyzed--the critical period of speech and language development occurs from birth to 3 years of age when children are most susceptible to chronic middle ear infections. Potential effects of the condition are explained to include auditory processing deficits and generalized speech and language deficits. An intervention approach, Project CHILD (Conductive Hearing Impairment Language Development), offering audiological monitoring, medical followup, parent training, and an emphasis on listening and language skill development, is described. (CL)

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Otitis Media and Learning Disabilities: More Than a Relationship?

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Introduction

The purpose of this presentation is to explore the degree of relationship between otitis media in young children and learning disabilities. Current research findings from various disciplines are discussed to substantiate our position that there is indeed more than an association between this common childhood disease and later learning problems.

The material for this session is organized into three parts. First, otitis media is defined and related behavioral characteristics identified through reported research are discussed. Next, the focus shifts to defining learning disabilities and depicting the link between otitis media and learning problems. Finally, a discussion of specific prevention and intervention programs for use by professionals involved with young otitis-prone children is presented.

Otitis Media

Definitions and Characteristics

One of the most common organic diseases of early childhood is recurrent otitis media, or middle ear infection (Paradise, 1980), which is usually characterized by the presence of middle ear fluid. The most frequent and significant effect of this fluid is a temporary conductive hearing loss in the young child (Zinkus & Gottlieb, 1980; Zinkus, Gottlieb & Schapiro, 1978; McLaughlin, 1976). While this hearing loss is usually mild and fluctuating, the research of Skinner (1978), Zinkus, Gottlieb and Schapiro (1978), and Holm and Kunze (1969) suggested that it can have significant adverse results on the child's present language and learning development.

Because a child with recurrent otitis media does not consistently receive accurate auditory information, the child may tune out sounds and/or respond inappropriately to sounds. Thus, it is not surprising to find that some young children with recurrent otitis media fail to attend to or differentiate between various environmental sounds, such as approaching footsteps, running water, or the sound of laughter. Since even a mild hearing impairment may distort sounds, a young child with recurrent otitis media will often exhibit significant delays in receptive language ability, that is, in the ability to understand others. The child may also have difficulty in learning to speak clearly and accurately.

The following facts about otitis media may also be helpful in

understanding the impact of this disease on young children.

. Otitis media is one of the most common diseases of early childhood.

. Otitis media usually occurs before a child is two and is common throughout the preschool years.

. When otitis media occurs frequently within a year's time, it is referred to as recurrent otitis media.

. About two-thirds of all preschool children have at least one episode of otitis media.

. About 12% of all children experience six or more episodes of otitis media before the age of six.

. Otitis media is experienced more frequently in winter than in summer.

Traditional Treatment Approaches

A familiarity with the different parts of the middle ear is important in understanding the nature of otitis media. Thus, the following discussion focuses on the impact of otitis media on the ear structure.

Normally, any germs that find their way to the middle ear are steadily drained out through the Eustachian tube. However, if this tube becomes congested because of a cold or infected throat, germs may become trapped in the middle ear. When the Eustachian tube is blocked, the air with which it is normally filled becomes displaced by fluid. This fluid, then, exerts pressure on the eardrum.

Sometimes, the pressure from this fluid becomes great enough to rupture the eardrum. A ruptured eardrum can be very painful to the child and may cause a permanent hearing impairment. Because of the serious complications that can result from middle ear infections, prompt medical attention is very important.

An antibiotic is often prescribed for a middle ear infection. As some children are resistant to the antibiotic drugs used in treating otitis media, further medical or surgical treatment is sometimes necessary. In some cases, a small tube is inserted through the eardrum to provide ventilation. (This surgical procedure is called a tympanostomy.) Once the middle ear space is cleared and the eardrum begins to heal, the tube usually falls out on its own. Failure to remove the fluid and ventilate the ear can result in damage to the eardrum and middle ear structures.

Learning Disabilities

Definition and Issues

According to the National Advisory Committee on Handicapped Children (1968) learning disabilities has been defined as follows:

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written languages. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include con-

ditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing or motor handicaps, to mental retardation, emotional disturbance or to environmental disadvantage.

Like other definitions, this one also has its inherent limitations. First, as Chalfant and King (1976) have noted, the learning disability label necessitates that the child involved have no other disability or handicapping condition.

Also, agreement on identifying psychological processes is lacking. However, Reid and Hresko (1981) concluded that the following processes "have been identified by psychological research to be important aspects of learning: (1) attention and vigilance; (2) perception; (3) memory; (4) language; and (5) social/emotional development. These processes are clearly integrated, with some being more complex and subsuming others" (p. 6).

Another definitional issue is related to the requirement of physiological correlates. Although some children identified as learning disabled clearly do have a neurological impairment, there are many identified LD youngsters who evidently do not have such an impairment.

Finally, poor school performance and a discrepancy between one's learning potential and actual performance must be evident in order

for a student to be labeled learning disabled.

Based upon the above accepted definition of learning disabilities, it is evident that the preschool population does not meet the eligibility criteria needed to be identified as LD. Probably one of the more devastating outcomes associated with the identification process for learning disabilities is the requirement for academic failure. Since otitis-prone preschoolers have not been involved in the formal schooling process, they have not had the opportunity to fail. However, this lack of involvement in the educational process does not mean that this group of young children is not prone to learning disabilities.

The Linkage

The critical period of speech and language development occurs from birth to about three years of age (Paradise, 1980; Zinkus, Gottlieb & Schapiro, 1978). It is during this time that children are most susceptible to chronic middle ear infections (Paradise, 1980; Zinkus & Gottlieb, 1980). A study of the language and auditory processing skills of school age children with a history of recurrent otitis media suggested a positive relationship between generalized speech and language disorders and recurrent otitis media (Holm & Kunze, 1969). Research has also shown that the fluctuating hearing impairments often accompanying otitis media may cause auditory processing deficits, which may persist long after the mechanical blockage of middle ear fluid has been removed (Zinkus & Gottlieb,

1980; Katz, 1978; Lewis, 1976).

Auditory processing involves the identification, interpretation, and organization of sensory data received through the auditory channel. These components of auditory processing play a significant role in the development of receptive language skills, defined as the translation of sound patterns into their symbolic meaning. In this sense, auditory processing skills can be seen as fundamental to language acquisition (Zinkus & Gottlieb, 1980). Thus, otitis media and the accompanying intermittent conductive hearing loss in the first few years of life may significantly inhibit language acquisition during the critical period of development.

Recent research also linked recurrent otitis media with later learning disabilities. In comparison to a group of young children who had auditory processing deficits, but no history of early middle ear infections, Zinkus and Gottlieb (1980) found that subjects with a history of recurrent otitis media were slower in developing word combinations, had depressed verbal intelligence scores, manifested auditory processing deficits, and were significantly poorer in reading. Katz (1978) found a positive relationship between even mild or fluctuating conductive hearing losses in young children and disorders of auditory perception, language development, and learning. A study conducted by Masters and Marsh (1978), comparing learning disabled subjects with regular class students in terms of middle ear pathology, found a significantly higher proportion of learning disabled subjects

with a history of middle ear disease. Findings by Freeman and Parkins (1977) suggesting that the etiology of some learning disabilities relate to recurrent middle ear disease added further evidence to the link between recurrent otitis media and later learning disabilities.

Hefferman (1977) noted that the usually mild medical implications of otitis media could easily lead to the misconception that it is a harmless problem, yet, the high percentage of language disordered children with a history of middle ear disease presents strong evidence that the significance of otitis media in young children goes beyond a possible medical complication. Groothius et al. (1979) noted that when otitis media becomes chronic or recurrent, hearing loss often occurred and resulted in delayed speech and cognitive development, especially if the hearing loss was unrecognized. Battin (1977) indicated that early identification and aggressive medical, educational, and audiological treatment are critical to the prevention of later auditory-language processing disturbances.

Although this reported research does suggest more than an association or link between otitis media and learning disabilities, there is still considerable debate regarding a cause and effect relationship. In addition to previously discussed definitional issues, Leviton (1980) has provided several additional explanations as to why this debate continues.

He has concluded the following:

. First, the lack of reported agreement that children with

serous otitis media are more likely to have a hearing impairment may be attributed to different types of subjects, e.g., some children might have serous rather than chronic otitis media.

. Next, although the hearing impaired are at risk for learning problems, it is not necessarily evident that it is the disability, i.e., the hearing impairment which is causing the learning problems.

Faulty or limited research designs have also been offered as an explanation for skepticism regarding a causal relationship. Also there is a need for additional investigation on the efficacy of educational programs designed to remediate the learning deficits of otitis-prone youngsters. Leviton has also discussed other more involved factors and the reader is encouraged to review his report in its entirety.

Despite these issues, to date there is strong evidence suggesting more than a link between otitis media and learning disabilities. Certainly, the probability of professional agreement will increase when definitional and research design issues are clarified and when intervention programs are validated.

Project C.H.I.L.D.

Project C.H.I.L.D. (Conductive Hearing Impairment Language Development) was developed in response to the high incidence of recurrent middle ear problems identified in the young children referred to the Toledo Public Schools Early Childhood Program for language-related problems. For example, during 1978-79, two hundred and seventeen

children with various types of handicapping conditions were enrolled in the program. Of these the greatest number of referrals were for hearing, speech and/or language disorders. Forty-seven (47) of the seventy-nine (79) children referred to the Early Childhood program because of speech and/or language delay were found to have recurrent otitis media. Confirmation of this condition was accomplished through a review of medical records and/or developmental histories with physical evidence of two or more episodes of otitis during the year, as measured by impedance audiometric testing.

An analysis of assessment data suggests that recurrent otitis media may have a negative cumulative effect on the language development of young children (see Table 1).

In order to best provide appropriate intervention services to this population of young children, three integral program components would be required:

. Children with conductive hearing impairments would need subsequent audiological monitoring.

. Medical follow-up as determined by periodic tympanometry would be provided as needed.

. Training of paren and other involved individuals would be necessary for an effective program.

The Project C.H.I.L.D. educational intervention program for young otitis-prone children focuses on the listening and language skill development and can be implemented in the home or in any appropriate

early childhood setting. If the youngster is less than three years of age, the home is considered to be the most appropriate setting for educational intervention. Three-to-five year olds, however, generally profit more from some type of organized early childhood setting with many and diverse opportunities for social interaction with peers and adults.

Table 1

Assessed Language Delays in Otitis Population at Enrollment 78-79

Age	Number	Average Language Delay*	
		Receptive	Expressive
0-2 yr.	2	2.5 months	6.5 months
2-3 yr.	11	6.5 months	9.2 months
3-4 yr.	14	10.0 months	15.1 months
4 + yr.	20	12.7 months	16.5 months

*Children with language level below 36 months used Receptive-Expressive-Emergent-Language Scale (R.E.E.L.) and children with language level above 36 months used (1) Carrow Test of Auditory Comprehension of Language and (2) Carrow Elicited Language Inventory.

Parents, like other individuals involved with young handicapped children, need specific knowledge about recurrent otitis media in order to effectively work with their language-impaired child. As a

result, one of the major goals of Project C.H.I.L.D. is to alert parents and professionals working with young children to the linkage between recurrent otitis media and later educational problems and to assist them in providing an environment designed to foster language growth.

Another approach to effective early intervention is to impact on those agencies working directly with young children before they enter into a more academic program, the obvious choices for awareness and training workshops were Head Start and kindergarten programs.

Toledo Head Start has continually demonstrated support for Project C.H.I.L.D. by participating in joint activities, such as the development and implementation of a training package for use with other Head Start programs. This training package includes awareness and training materials, information on conducting parent education workshops, technical assistance to supervisory personnel, an outline for conducting teacher training workshops, ideas for follow-up/trouble-shooting consultation, and procedures for outcome evaluation.

Otitis media affects young school age children with as great a frequency as it does preschoolers. Although the focus of Project C.H.I.L.D. is on the three-to-five year old group, project staff recognized the need to identify otitis-prone children already enrolled in a formal school setting. The need for early intervention for this age group is critical. In fact, an effective kindergarten screening program with appropriate follow-up early intervention can prevent or alleviate later school problems (Northern, 1980).

Conclusions

To date, we know that many young children who periodically experience middle ear problems throughout the first several years of life are likely to later have academic difficulties. The focus of these problems seems to be in understanding and using language in a meaningful age-appropriate manner. Although these young children are not eligible for a learning disability label, they should be provided with special early educational opportunities designed to ameliorate their learning problems and thus minimize the need for special services during the formal school years.

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